ARSENIC REMOVAL

THROUGH A SIMPLE FILTRATION PROCESS

The Origin of Arsenic

Arsenic is an element that occurs in the earth's crust. Accordingly, there are natural sources of exposure. These include weathering of rocks and erosion depositing arsenic in water bodies and uptake of the metal by animals and plants. Consumption of food and water are the major sources of arsenic exposure for the majority of the population. People may also be exposed from industrial sources, since arsenic is used in semiconductor manufacturing, petroleum refining, wood preservatives, animal feed additives, and herbicides.

Typical Installation

Maximum Contaminant Level

The World Health Organization (WHO) provisional guideline for arsenic in drinking water is 10 micrograms per liter (µg/L) or parts per billion (ppb) as of 1999. The US-EPA established a Maximum Contaminant Level (MCL) for arsenic in drinking water at 10 micrograms per liter (µg/L) in 2001.

Public Health Concerns

Arsenic can combine with other elements to form inorganic and organic arsenicals. In general, inorganic derivatives are regarded as more toxic than the organic forms. While food contains both inorganic and organic arsenicals, mainly inorganic forms are present in water. Exposure to arsenic at high levels poses serious health effects, since it is a known human carcinogen. In addition, it has been reported to affect the vascular system in humans and has been associated with the development of diabetes. Arsenic is poisonous in doses significantly larger than 65 mg (1 grain), and the poisoning can arise from a single large dose, or from repeated small doses, as, for example, inhalation of arsenical gases or dust.

Treatment Technology

In water, the most common valence states of arsenic are As^{+5} (or arsenate) which is more prevalent in aerobic surface waters, and As^{+3} (or arsenite) which is more likely to occur in anaerobic ground waters. As^{+3} may be converted through preoxidation to As^{+5}. In the arsenate state, arsenic tends to adhere to ferric hydroxide, a common precipitate produced in the CR Ferrosand Filtration process.

Advantages of Simple Filtration Over Other Technologies

- Up to 95% removal of total arsenic through a simple, single-stage filtration process alone
- Simple control requirements, can be fully automated for minimal operator intervention
- No need for expensive, and complicated membrane systems
- Efficient operation, minimal waste product with no need for neutralization
- No need for expensive, consumable ion exchange resins or regeneration equipment
- No need for redundant pretreatment processes
- No handling of dangerous chemicals

Hungerford & Terry, Inc.

An innovative leader since 1909, Hungerford & Terry, Inc. continues to set industry standards for quality and reliability in water treatment system design. Contact Hungerford & Terry, Inc. for treatment recommendations and design assistance.

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